

Docket No.: 0315-0158PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Antonio Luiz Duarte BRAGANCA et al.

Application No.: 10/518,443

Confirmation No.: 7833

Filed: July 1, 2005

Art Unit: 1793

For: SOLID CATALYST COMPONENT FOR
POLYMERIZATION AND
COPOLYMERIZATION OF ETHYLENE,
AND, PROCESS FOR OBTAINING THE
SAME

Examiner: J. E. McDonough

RESPONSE TO NOTIFICATION OF NON-COMPLIANT APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

February 9, 2009

Madam:

In response to the Notification of Non-Compliant Appeal Brief mailed January 14, 2009, the Non-Compliant Paragraph V (SUMMARY OF CLAIMED SUBJECT MATTER) is being submitted herewith in the appropriate format. It is respectfully requested that the Paragraph V submitted herewith be inserted in the place of the Paragraph V filed with the Appeal Brief on December 8, 2008.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention defines a unique catalyst composition which contains specific amounts of catalytically active components, that is, specific amounts of Ti, Mg and Cl, which when used in a polymerization process produces homopolymers and/or copolymers of either high density polyethylene (HDPE) or Linear Low Density Polyethylene (LLDPE) with a controlled morphology, having one or more of the following properties, that is, high bulk density, a very small quantity of fines in the product, good co-monomer insertion, improved catalytic activity with low catalytic decay, and a substantial homogenous distribution of the alpha-olefin within the polymer chain in connection with LLDPE.

The main focus of the present invention is the specific catalyst, a process for producing such a catalyst, as well as a process for the polymerization or copolymerization of a polyolefin such as polyethylene, using such a solid catalyst. The composition of the catalyst of the present invention which contains Ti, Mg, Cl alkoxy groups and organo metallic compounds and the use of non-polar organic solvents to impregnate the particular silica, defines a catalyst system having a different behavior which, in turn, produces a different final product in the polyolefin polymerization and copolymerization process. That is, because the present invention utilizes a specific amount of titanium, a specific amount of magnesium and a specific amount of chlorine, which remains fixed on the solid catalyst component and because of the use of inert organic solvents (non-polar solvents), it is possible to produce particles of homo and copolymers of olefins; for example, ethylene, with controlled morphology, having a high bulk density and containing a very small quantity of fines. The catalyst system of the present invention is also effective in achieving good co-monomer insertion into the final product as well as improved catalytic activity and low catalytic decay.

Catalyst systems currently being used in polymerization processes are based on the use of a magnesium dichloride support with titanium sites deposited on the support which is a very high activity catalyst in LLDPE copolymerization. As known in the state of the art, this kind of support produces a catalyst with a high degree multiplicity of titanium sites and because of this

fact, the comonomer response LLDPE copolymerization is heterogeneous. This heterogeneous behavior is due to the fact that the titanium sites have a different steric and an electronic neighborhood. This heterogeneity is reflected on the higher xylene soluble fraction which is generated when the LLDPE is produced. With the intention of getting more homogeneity of the titanium sites and, consequently, better comonomer response, Luciani I and Luciani II relied upon by the Examiner and discussed here-in-below added a compound to the process known as a donor or electron donor compound. This donor was added in the catalyst synthesis or during the polymerization and acts as a selective poison for some of the titanium sites. The way it acts is based on Lewis Theory (G.N. Lewis, 1923), which says that in acid-base reactions "bases donate pairs of electrons and acids accept pairs of electrons". In Luciani I and Luciani II, an aromatic or aliphatic ester is used for a solution preparation of magnesium and titanium compounds. In this case both magnesium and titanium compounds used in the solution preparation act as Lewis acids and the ester, which has oxygen groups, acts as a Lewis base. When this solution is deposited over an inert support, part of this donor remains bonded to the titanium or magnesium sites. This kind of selectivity poisoning of titanium or magnesium sites affects the behavior thereof during copolymerization generating more homogeneous sites. This higher homogeneity of the sites, consequently, affects the xylene soluble fraction content which becomes smaller during the copolymerization. Examples of Lewis acids are titanium and magnesium compounds and of Lewis bases are compounds with oxygen, nitrogen groups (water, ester, ether, amines, etc.) which have extra electrons to donate.

As can be seen by referring to the present application, no electron donor or donor is used, as detailed in the Summary of the Invention, in the Detailed Description and in the Claims. In the present invention, the homogeneity of the sites of the solid catalyst component is reached through the amounts of components present in the solid catalyst and in the fact that no donor or electron donor is used during the solid catalyst component preparation.

The subject matter of claim 48 can be found on page 4, lines 10-26 and lines 16-32; page 11, lines 7-8; page 13, lines 28-30 and page 14, lines 1-6.

The subject matter of claim 58 although directed to a catalyst composition rather than the process of claim 48 contains the same components and amounts thereof as claim 48 which can be found on the same pages as claim 48.

The subject matter of claim 61 can be found on the same pages of the specification as claim 48 and additionally on page 14, lines 27-30.

The subject matter of claim 65, similarly as claim 58, contains the same components and amounts thereof as claim 48 and can be found on the same pages as claim 48.

CONCLUSION

It is respectfully requested that the above replacement Paragraph V be substituted for the Paragraph V filed in the Appeal Brief on December 8, 2008.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Joseph A. Kolasch Reg. No. 22,463 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.147; particularly, extension of time fees.

Dated: February 9, 2009

Respectfully submitted,

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